DETAILED ACTION

Response to Amendment

1. The amendment received on January 17, 2008 has been entered in full.

2. Applicant's amendment to the claims has been entered and based on the amendments claim rejections under 35 USC 112 on the respective claims have been withdrawn.

3. Applicant's arguments with respect to rejected claims as presented in the amendment filed have been fully considered but are moot in view of new ground(s) of rejection(s).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4-8, 11, 17 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Manak et al., 1998, "3D data compression of hyperspectral imagery using vector quantization with NDVI- based multiple codebooks".

Regarding claim 1, claim 1 recites "a method for compressing multi-dimensional data comprising the steps of: a) receiving the multi-dimensional data comprising a plurality of data vectors of an image of an object" Manak discloses "**3D data compression of hyperspectral**

imagery using vector quantization with NDVI-based multiple codebooks" (page 2680, Title of the document, left column – topic- introduction – higher data rates for transmission representing continuous data flow, right column - last paragraph – different land cover types within the scene/image; page 2681, left column).

Manak further discloses "In this paper we use NDVI as a tool to segment the scene of a datacube into n different land cover types (i.e. classes) that occur within the scene. The datacube is then separated in to n sub-sets called Training Sub-sets (TSS), each of which corresponds to a distinct class. Accordingly, while keeping the same number of codevectors, we generate not just a single codebook but n smaller codebooks (called sub-codebooks) of equal size from each TSS. For example, a single codebook of size 256 can be segmented into 8 sub-codebooks of size 32 each, where all 32 codevectors represents the same class, and are used to code only the spectra which belong to that class" (page 2681, left column, 1st para.), where codevectors form a cluster of vectors within the subcodebook within TSS belonging to particular class of spectra and vector similarity is defined by the class. Thus the above citation conforms to the limitation **"separating the plurality of data vectors into at least two clusters based on similarity of the data vectors such that similar data vectors are grouped together into one of said at least two cluster".**

Manak further discloses "The NDVI calculation consists of generating an NDVI image for an input datacube. The NDVI classification step classifies the NDVI image create a classification map, referred to a "class-map". The block of TSS segmentation uses the class map to separate the datacube into an array of n TSS corresponding to the n classes. Each TSS is used independently for training its own sub-codebook in the codebook generation step. The array of n **sub-codebooks is passed to the coding step**, where the class-map is used to match each vector to be compressed with the best codevector from the appropriate sub-codebook" (page 2681, left column, 2nd para.),

thus conforming to the limitation "providing each of the at least two clusters to at least a compression engine for processing". Further see figure 1.

Regarding claim 2, claim 2 recites "wherein the data vectors are partitioned in a geometrically irregular fashion" Manak as discussed in the rejection of claim 1, discloses that the segmentation or separation of data subcodebooks is done based on the class of the spectral data and classes are separated according to the spectral data and apparently spectral data in an image is partitioned in a geometrically irregular fashion. Further support can be found on page 2682, left column, topic 3.3 - unsupervised classification.

Regarding claim 4, Manak discloses determining a plurality of codevectors through training for approximating each of the data vectors of a cluster of the at least two clusters with a fidelity above a predetermined threshold based on the data vectors contained in the cluster and encoding each of the data vectors of a cluster using a codevector of the plurality of codevectors (figure 1; page 2680, right column; page 2681, left column, 2nd para.; page 2680, right column, 2nd para.; topic 3.2 and topics 3.4-3.5).

Regarding claim 5, claim 5 recites "storing the plurality of codevectors in a codebook of a cluster, and storing in an index map of a cluster in index for each of the data vectors in the cluster indicative of a codevector's location within the codebook of the cluster" Manak as discussed in the rejection of claims 1 and 4 in view of the figure 1, provides encoding of the data vectors of a cluster using a codevector of a cluster using a codevector of the plurality of the plurality of codevectors. Figure 1 further shows that index map and the codebook are also transmitted to the decoding

portion and clearly all the information to be transmitted has to be known and stored (e.g. buffered) at the transmitting side before it is transmitted and apparently at the decoding side all the information used in encoding has to be provided that was used in encoding for proper reconstruction of data.

Regarding claim 6, Manak discloses SAMVQ (page 2681, left column, last few lines).

Regarding claim 7, claim 7 has been similarly analyzed and rejected as per the citations for claim 5.

Regarding claim 8, Manak discloses wherein the size of the at least two clusters is approximately similar within limits of difference (page 2682, topic 3.4, left column).

Regarding claim 11, claim 11 has been similarly analyzed and rejected as per claims 1 and 4.

Claim 17 has been similarly analyzed and rejected as per claim 1.

Claims 30-32 has been similarly analyzed and rejected as per claims 1-5.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manak et al., 1998, "3D data compression of hyperspectral imagery using vector quantization with NDVI- based multiple codebooks".

Regarding claim 3, claim 3 recites parallel compressing where each of the at least two clusters is assigned to a respective compression engine of the at least two compression engines for simultaneously processing the at least two clusters. Manak does teach processing at least two clusters but do not teach the parallel processing of the clusters. However, examiner here takes official notice that parallel processing is very well known in the art of image compression using vector quantization. It would have been an obvious choice for one of ordinary skill in the art at the time of invention was made to use parallel processing if the requirement exists for a fast and real time image processing.

8. Claims 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Further, the claims in this office action have been analyzed in view of the reference Manak,et al, which was listed in the IDS filed by applicant on 03/2/2005. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manav Seth whose telephone number is (571) 272-7456. The examiner can normally be reached on Monday to Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Bhavesh M Mehta/

Supervisory Patent Examiner, Art Unit 2624

/Manav Seth/
Examiner, Art Unit 2624
June 07, 2008